

THUNDER TIGER



TOC 35% Extra 260 Assembly Manual

Table of contents

Thunder Tiger Contact Information.....	Page 3
Introduction.....	Page 4
Kit Contents.....	Page 5
Items Needed to Complete.....	Page 6
Tightening and Re-shrinking Covering.....	Page 7
Landing Gear Installation.....	Page 8
Engine Installation.....	Page 11
Servo Installation.....	Page 17
Servo Arm Assembly.....	Page 20
Control Horn and Linkage Installation.....	Page 23
Cowl Assembly.....	Page 28
Canopy Assembly.....	Page 29
Radio Gear Installation.....	Page 31
CG Location.....	Page 32
Recommended Throws.....	Page 32
Before you fly for the first time.....	Page 33

THUNDER TIGER

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Thank you for choosing the Thunder Tiger TOC 35% Extra 260. We have put great effort into making this the best plane you will ever build and fly. We wish you great success in the assembly and flight of your TOC Extra 260.

WARNING

An R/C aircraft is not a toy! If misused can cause serious bodily harm and property damage. Fly only in open areas, and AMA (Academy of Model Aeronautics) approved flying sites.

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INTRODUCTION

The Thunder Tiger TOC Extra 260 is a new level of ARF it comes with a complete SAE hardware package. All of the hinge slotting is completed for you at the factory including the rudder. . Before you begin construction of your new TT TOC Extra 260 we recommend that you open and inspect everything even if there is not visible damage from shipping.

USING THIS MANUAL

When you start a construction section, it is a good idea to first read that entire section before cutting, drilling, or gluing. For example, if you are about to begin the section called “Mounting the Engine”, read that entire section before doing anything else. Reading the entire section will give you a good feel of where you are headed and the options available.

KIT CONTENTS

- Left Wing Half and Aileron with hinges glued in at the factory
- Right Wing Half and Aileron with hinges glued in at the factory
- Rudder with hinges glued in and pinned so the rudder is removable
- Fuselage
- Aluminum main gear
- Rubber wheels
- Fiberglass Wheel pants
- Aluminum wing and stab tubes
- Control horns with 4-40 Ball Links
- Complete hardware package with SAE bolts and nuts
- Aluminum Spinner
- Canopy and Hatch

NECESSARY EQUIPMENT

Engine: 100cc Engine of your choice

Servos: 8 Digital High Torque Servos

Landing Gear: Tail Wheel of your choice

Servo Extensions:

- ☐ 3-3"
- ☐ 2-6"
- ☐ 2-12"
- ☐ 2-24"
- ☐ 2-48"

Match Boxes: 3 depending on your setup

Remember this is based upon your setup. You will need to determine your actual quantities of items needed. Based on the components that you use .

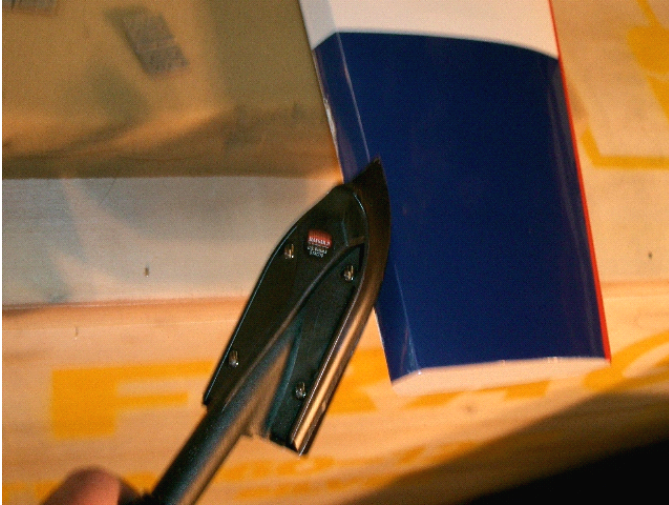
NECESSARY TOOLS

- ☐ Hand Held Drill
- ☐ Drill Press
- ☐ Drill Bits
- ☐ Allen Wrenches
- ☐ Pliers
- ☐ Socket or Wrench Set
- ☐ Modeling Knife
- ☐ Covering Iron or Heat gun
- ☐ 30 min epoxy
- ☐ 5 min epoxy
- ☐ Zap ca thin
- ☐ Zap-a-Gap CA +

SHRINKING AND TIGHTING COVERING DO NOT SKIP THIS STEP

- ❑ When you first open the crate for the aircraft there may not be any wrinkles in the covering. Please take the time to go over all of the seams and covering .This ensures all seems will be tight and secure during 3D or IMAC flying.





- ❑ Use a heat gun and iron to go over all of the covering
- ❑ If bubbles show up you can use a small needle to puncture the bubble and then iron it down. On a multi layer area make sure to only puncture the top layer.

LANDING GEAR INSTALLATION

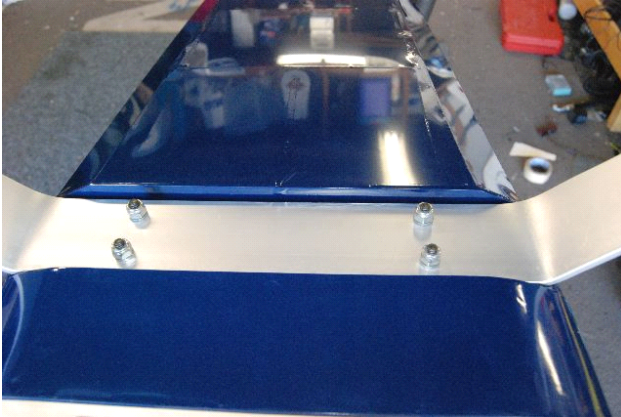
Gather the following parts:

- ❑ Main Gear
- ❑ Tail Gear – (Not included in the kit)
- ❑ Screws for tail gear (Not included in the kit)
- ❑ 4- 8-32 x 1” Allen Bolts
- ❑ 4- 8-32 Lock Nuts
- ❑ Wheels
- ❑ Axles
- ❑ Wheel Collars
- ❑ Wheel Pants
- ❑ (4) 4-40 Allen bolts and blind nuts for wheel pants

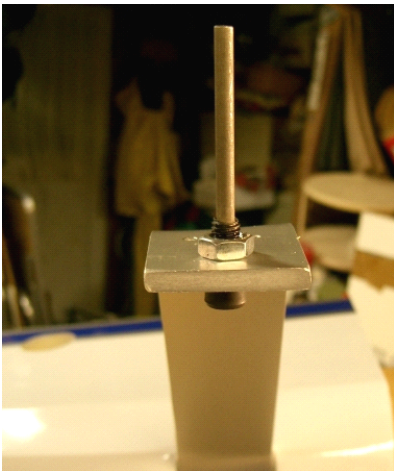
Tools Required:

- ❑ Allen wrench for 8-32 Bolts
- ❑ Blue Loc-tite
- ❑ Wrench for 8-32 Nuts

- ❑ Install the main gear to the landing gear plate. Gather 4 1/4x20 allen bolts and lock nuts. Install the allen bolts and lock nuts. Tighten gear



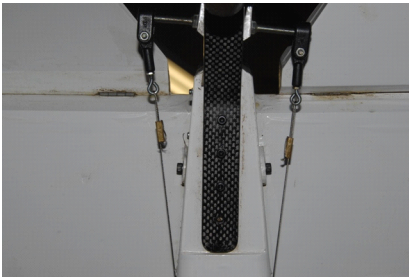
- ❑ Install the wheel axels as shown below. Make sure and use loc-tite and the threads.



- ❑ To install the wheel pants drill a hole that is big enough to go over the axle nut. Then you will need to install the wheel pants after you install the axels. The wheel pants are held on with 2 – 4-40 bolts and blind nuts. We recommend using a little bit of silicone between the landing gear and the wheel pant to help reduce vibration.



- ❑ Install tail gear per the instructions that came with tail gear of your choice.
Warning: Make sure the tail gear is rated for a 35% aircraft. Otherwise tail gear may fail and cause loss of control, and loss of aircraft or damage to property, or people.



- ❑ Install the tires included in the kit with the wheel collars that are supplied in the hardware package. Center the tire in the wheel pants and tighten down the wheel collars. Also once the wheel is centered in the wheel pant we suggest you grind a flat on the axle to prevent collar movement. Don't forget to put loc-tite on the wheel collar set screws.



Shown without wheel pants for detail

This completes the landing gear installation.

ENGINE INSTALLATION

This plane is compatible with any 100cc engine on the market. We used the DA 100cc engine for our installation

9. Gather the following parts:

- ☐ 100cc Engine
- ☐ Standoffs for engine if being used (length may vary ours were $\frac{3}{4}$ ") – not included with the kit
- ☐ Mounting Hardware (not included with kit)

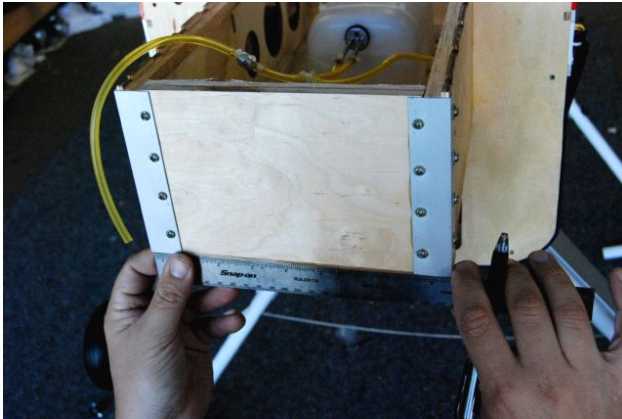
2. Tools Required:

- ❑ Drill and Drill Bits
- ❑ Sanding Block
- ❑ Ruler
- ❑ Pencil
- ❑ Allen Wrench for Engine Mounting Hardware
- ❑ Thread locker
- ❑ 30 min Epoxy

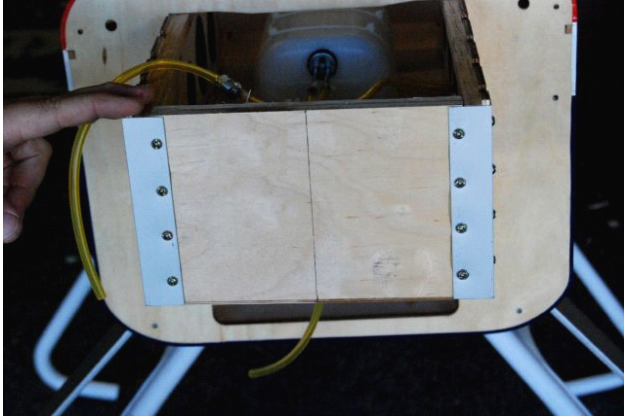
Firewall Installation

NOTE: The motor box already has the proper amount of right thrust built into it do not change the thrust angles.

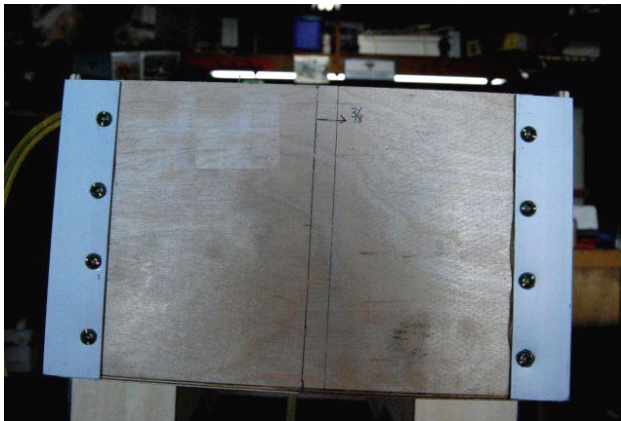
- ❑ Locate the 1/4" Thick Firewall and use 30 min epoxy to secure the firewall into place
- ❑ Use clamps to hold the Firewall to the motor box sides. Let the glue fully dry before removing the clamps
- ❑ Now locate the required angle brackets, and mounting hardware. Drill the holes and mount them to the outside of the motor box/firewall. See picture below for completed Installation.
- ❑ The first step in mounting your engine after the firewall is installed is to find the center of the firewall and trace the line on the front of the firewall.



- ❑ Transfer this measurement to the top and bottom of the firewall. Draw a straight line connecting the two measurements.



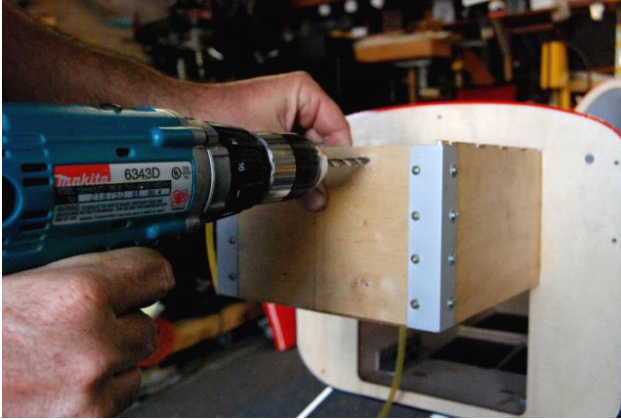
- Now offset this line by $\frac{3}{8}$ " to $\frac{1}{2}$ " for the engine offset



- The line that runs horizontally can be moved to accommodate your particular engine. However, the centerline of the crankshaft should be placed as close as possible to the wing centerline extended. We are now ready to drill out our firewall for our engine. Use the included template to mark your engine mounting holes. Use an ice pick or awl to push through the center of each of the 4 engine mounting holes. Make sure you make the hole big enough to find later. When done, drill the firewall through each awl mark with the appropriate size bit for your engine mounting bolts. (1/4- 20) hardened, socket head bolts and blind nuts will do nicely.

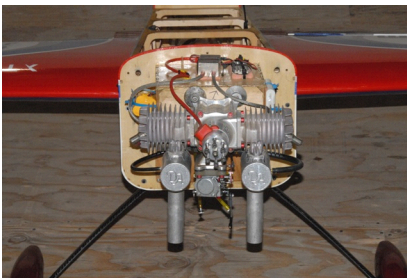


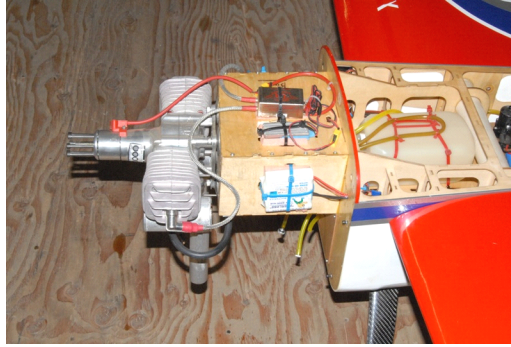
- ❑ The last step is to drill the holes, as mentioned above make sure you use the correct hardware and size holes.



TIP: After drilling the holes use a sanding block to knock down the high areas so that the engine will sit true to the firewall.

- ❑ After you are done drilling the holes, you are ready to mount the engine. Use the hardware of your choice as mentioned above use hardened socket head bolts. Make sure that you use thread locker so the bolts do not come loose during flight. See pictures below for completed engine installation.





Congratulations you have just completed the hardest step of this plane. The rest of this manual goes through gear installation. We will now show you how to install the throttle servo. We will leave the linkage setup to you.

THROTTLE SERVO INSTALLATION

Gather the following Parts:

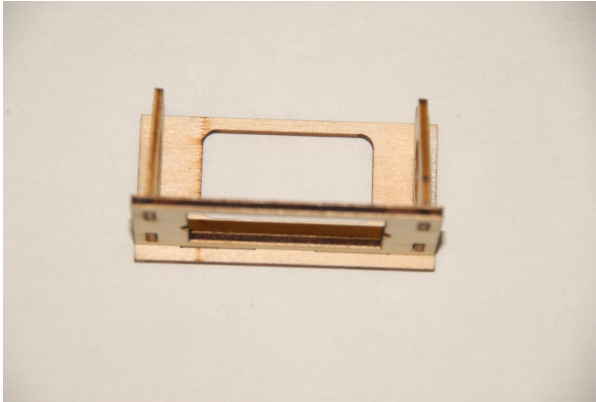
- ☐ Throttle Servo
- ☐ Servo Extensions as needed for your type of gear installation
- ☐ Servo Screws
- ☐ Thin C/A
- ☐ Servo Arm
- ☐ Throttle Servo Linkage
- ☐ 2- 4-40 Ball Link Sets

Tools Required:

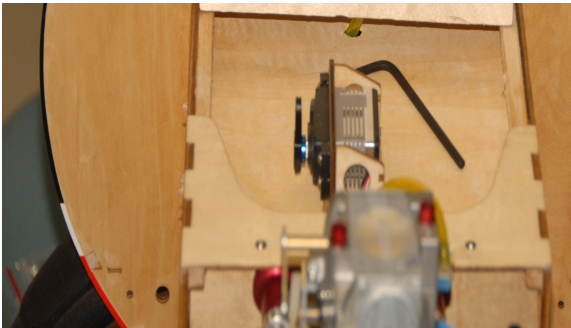
- ☐ Drill and Drill Bits
- ☐ Allen Wrench for Servo Screws

- ☐ The first step is to locate the throttle arm and whole location for your throttle linkage drill this first. Then where you are going to install your servo. We chose to use the supplied servo mount to install our throttle servo.
- ☐ You will need to assemble the servo mount and glue it together.

- ❑ Locate the proper spot for the throttle servo per your setup to have a clean and linear setup.



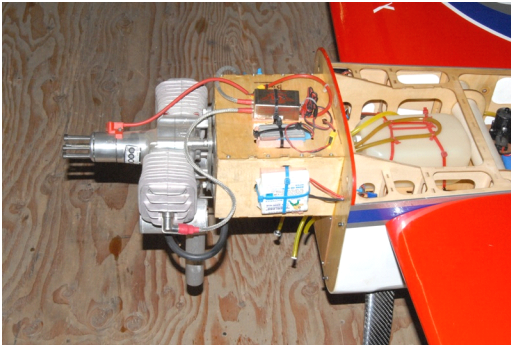
- ❑ Glue the throttle servo mount to the location you picked out per your throttle linkage.
- ❑ Install your servo to the mount per the manufacturer's specifications.



- ❑ Next you will need to run your fuel supply line to the engine. Since Ace Hobby already supplies you with the fuel tubing and a tank already installed this is relatively simple. We drilled a hole in the floor of the motor box and ran the tygon fuel tubing through the hole and to the motor. Hook up the fuel supply and per the motor manufactures directions.
- ❑ Next you can glue on screw on the lid for the motor box.

Ignition Installation

- ❑ Now install the ignition we installed are on top of the motor box after the motor box cover has been installed. This leaves the ignition open for easy accessibility and it will give it some extra cooling. Do not forget to install the motor box roof this adds allot of structural support. To install the ignition we traced the sides of the ignition on to the motor box roof. We then drilled four holes, one inside of each corner of the ignition box using the lines you made for reference. Then use a piece of foam under the ignition and zip-tie it to the top of the motor box.



You have just completed the motor installation

SERVO INSTALLATION

- We will cover the installation of the elevator servos in detail. For the wing servos will tell you what extensions you need and the rest is the same as the elevators.

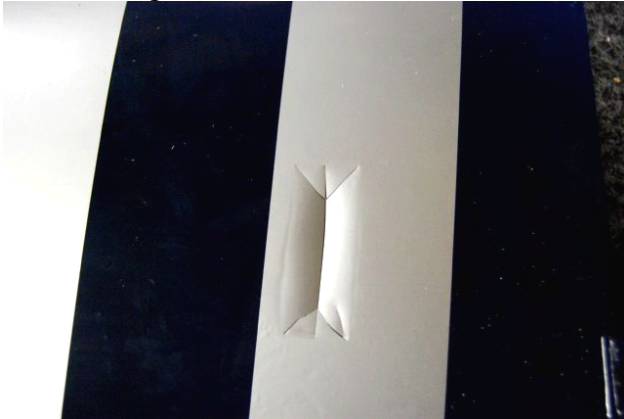
Gather the following parts;

- ❑ 8- High Torque Digital Servos (2- Elevator, 4-Wings, 2-Rudder)
- ❑ 35 Servo Screws
- ❑ Servo Arms (supplied with kit)
- ❑ Thin C/A
- ❑ Heat shrink 3/8" to 1/2"
- ❑ Servo Extensions (need lengths)

Tools Needed:

- Modeling Knife
- ❑ Iron (for covering)
- ❑ Tape
- ❑ Heat Gun
- ❑ Drill
- ❑ Drill Bits

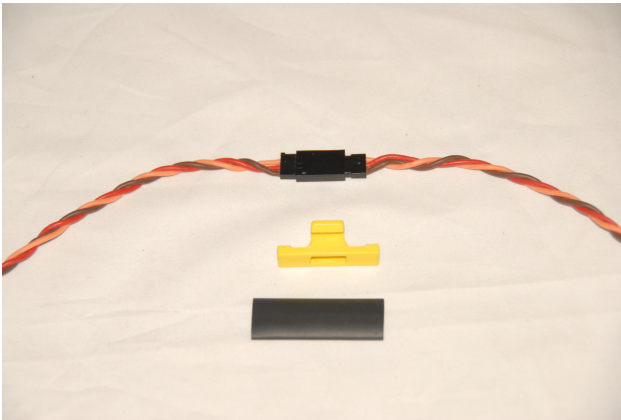
- First thing is to cut the servo bay opening out. We decided to leave the covering in place and iron it down this will eliminate the covering from lifting or coming off in flight.



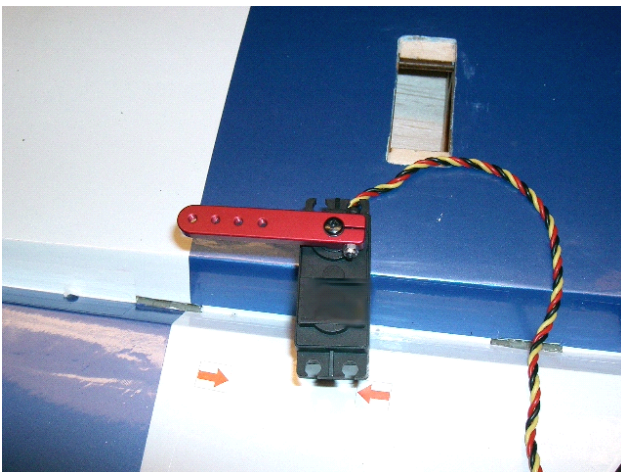
Use your iron to iron down the covering into the servo bay, some minor trimming of the covering may be necessary.



- ❑ The above is a completed picture. You can trim the covering in the servo bay .Repeat this step on all of your servo bays.
- ❑ Next you will install the servos, the outboard servo will need a 6” extension installed on the servo wire. On our installation we used heat shrink to join the servo extension to the servo wire. We also used a plastic sleeving to go over the servo wires to protect them from chafing. See figures below



- ❑ Use a piece of blue tape to connect the end of the servo connector to the string installed in the servo bay. Pull gently on the end of the string by the root rib of the elevator. This will fish the servo wire through all of the ribs. Afterwards secure the end of the extension in the elevator so it does not fall back in. Repeat this for the wings and other elevator half.



Wing Servo Installation

- ❑ Perform the step for cutting the covering out around the servo bay as mentioned in the above step
- ❑ Install servo extensions as necessary for your setup. Use heat shrink or something to secure the extensions to the servos.



Servo Arm Assembly

Gather the following parts:

- ❑ Kit supplied servo arms
- ❑ Round servo disc arms (supplied with servos)
- ❑ Screws (supplied with kit)

Tools Required:

- ❑ Drill and drill bits
- ❑ Screw driver
- ❑ Thread locker

This will walk you through the assembly of the kits supplied servo arms



- ❑ Double check that your servos are centered and there is no sub trim in the radio
- ❑ Now place the metal servo arm on top of the wheel making sure arm is parallel with control surface.
- ❑ Mark hole position on servo wheel



- ❑ Using a 2mm drill bit, drill four holes through the servo wheel.(You may choose to purchase some metal after-market servo wheels or arms for added strength. If after-market arms are used, they should be 1-1/2" long



- ❑ Once the four holes are drilled, install the metal arm to the wheel using the screws supplied with the kit.
- ❑ Finally install the assembly to the servo. Use thread locker to make sure your servo arm does not fall off.

You have just completed the servo arm assembly

Rudder Servo Installation

(Pull/Pull Install under Control Horns)

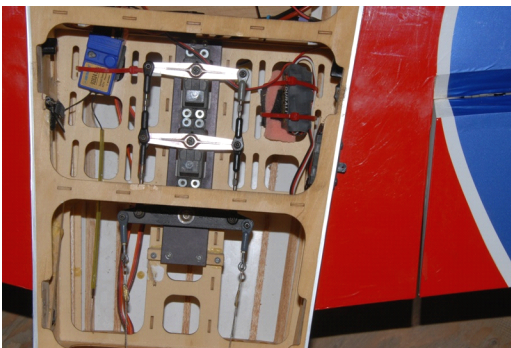
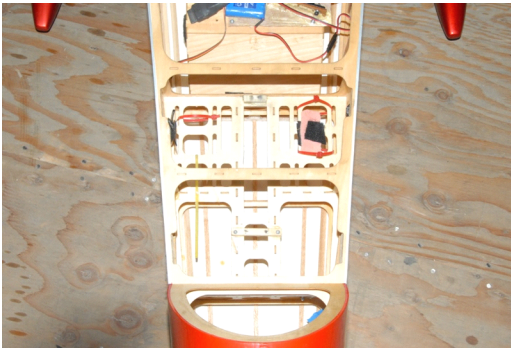
Gather the following parts:

- ❑ 2- High Torque Digital Servos
- ❑ Servo Extensions
- ❑ Control Horns, and servo linkages for rudder
- ❑ 8- Servo Screws
- ❑ Thin C/A

Tools Required;

- ❑ Drill
- ❑ Drill Bits
- ❑ Allen Wrench or Screw Driver for Servo Screws

The configuration and quantity of servos will depend on the torque of servos used as well as your flying style. We went with two Ds1015 (Ace8127) in a rudder tray. You will need to add some wood under the tray to reinforce it . Also you will need to install two small wood blocks for the tray to mount to.



- ❑ The above picture is with the servo installed. Again the number of servos will depend on your flying style.

You have just completed the rudder servo installation

Control Horn Installation

Tools Required:

- ☐ Drill Press or Hand Held Drill
- ☐ Drill Bits
- ☐ Epoxy
- ☐ Pen or Pencil
- ☐ Ruler

Gather the following parts:

- ☐ Wings
- ☐ Elevators
- ☐ Control Horns
- ☐ Linkages

- ☐ After you have installed all of your servos and servo arms, power up and center your servos. Several servo manufacturers make devices just for this process.

- ☐ Now draw a line from the outermost hole on your servo arm to the hard point on the control surface. You want your control horn to be 90 degrees to the control horn.

- ☐ You will need to drill through the hard points to install the control horns. This can prove to be a little tricky especially with the hinges being glued in already.

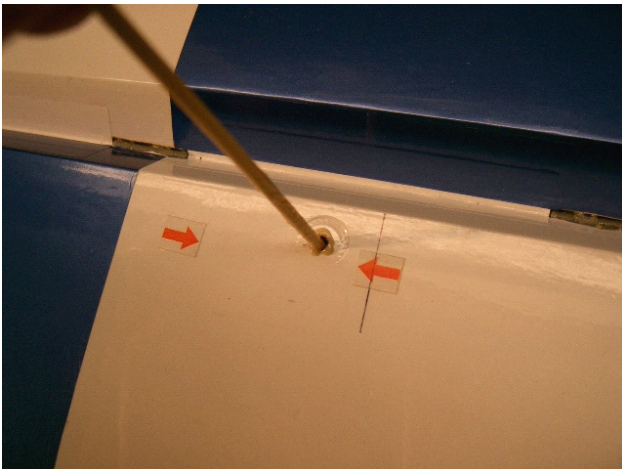
- ☐ The first step is to level the aileron or elevator to the drill press.

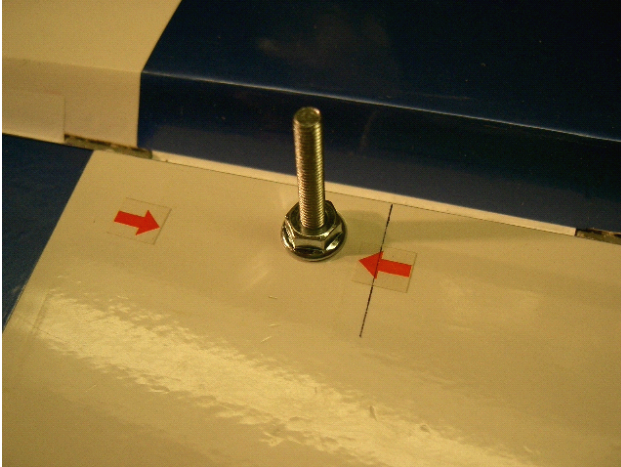
- ☐ You will then drill a hole just slightly smaller than the outside diameter of the control horn.

- ☐ Then drill a hole in the top of the surface you are working on that is big enough for the head of the control horn to be recessed into the top of the surface



- ❑ Lastly thread the control into the hole that you drilled.
- ❑ After the holes are drilled out use a small piece of dowel or barbeque skewer to spread epoxy or thin ca inside of the hole that you drilled out.





REMEMBER YOU WANT THE CENTER OF THE CONTROL HORN PIVOT POINT TO BE IN THE CENTER OF THE HINGE LINE.

Rudder Control Horn Installation

- ❑ For the rudder control horn installation you will now drill the second hole to counter sink the head of the control horn. During installation you will need to make sure that the control horn is even on both ends.



TIP: Do not forget to put thread locker all of the nuts on the control horn linkage.

Pull/Pull Assembly

Gather the following parts:

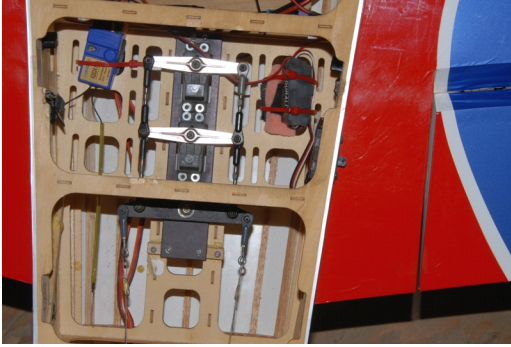
- ❑ Pull/Pull Wire
- ❑ Hardware related to pull/pull

Tools Required:

- ❑ Pliers to cut and crimp cable
 - ❑ Thin C/A
 - ❑ X-Acto Knife
-
- ❑ Locate the pull/pull exit holes located in the fuse. Use a sharp modeling knife to cut the covering away from these exits



- ❑ Guide the cable through these holes and into the fuse where the rudder servos are located.
- ❑ Complete the assembly as shown in the above picture. When crimping the cable with the brass tube that is included make sure you fish the cable through the crimp at least 2 times. After you crimp the brass tube use some thin C/A for a little extra security.
- ❑ Center the rudder and use a piece of blue tape to hold the rudder at center
- ❑ Power up your rudder servo(s) and make sure they are centered
- ❑ Make the same assembly as you did earlier in this section and attach to your rudder servos
- ❑ Tension the rudder servo wires and guide through the eyelets on the 4-40 bolts that you attached to the rudder servo(s).



- ❑ Use the same method as mentioned above to crimp the cable

You have just completed the Pull/ Pull Setup

Linkage Installation

- ❑ We will walk you through the linkage installation for the elevators. The TTTOC kit includes all of the necessary parts to complete this step.

Gather the following parts:

- ❑ Threaded linkages (short ones for elevators)
- ❑ 4-40 Ball Links (4 for Elevators)
- ❑ Mounting Hardware for Ball Links to Servo Arms

Tools Required:

- ❑ Pliers
- ❑ Loc-Tite



- ❑ Thread one end of the threaded rod into the control horn ball link. We suggest about 14 turns.
- ❑ Power up your elevator servo and make sure that it is centered
- ❑ Center the elevator half and use a piece of blue tape to hold it centered
- ❑ Thread the other end of the rod into the 4-40 ball link. As stated above we suggest about 14 turns.
- ❑ Use the supplied hardware to secure the linkage to the servo control arm.
- ❑ Repeat this step for the other elevator half

You have just completed the elevator control linkage assembly

Repeat this assembly process for the wings. Remember to power up the servos and make sure they are centered and moving in the same direction to avoid damaging the aircraft.

Cowl Installation and Cooling

- ❑ The cowl assembly is pretty straightforward. We will walk you through the assembly and the installation of standard mufflers.
- ❑ Install the mufflers if you have not already done so
- ❑ Tape a piece of paper to the bottom of the fuselage, trace the location of the mufflers to the paper and cut those locations out.
- ❑ Remove the mufflers and mount the cowl to the fuselage, trace the marks you made onto the bottom of the cowl
- ❑ Use a dremel to cut out the muffler locations

- ❑ Verify you have enough clearance around the mufflers to be able to remove and install the cowling.
- ❑ This is a completed picture of the cowl with the standard mufflers installed



You have just completed the cowl assembly

Canopy Assembly

Gather the following parts:

- ❑ Canopy Frame
- ❑ Canopy
- ❑ Pilot (not included)
- ❑ Canopy Frame Allen Bolts

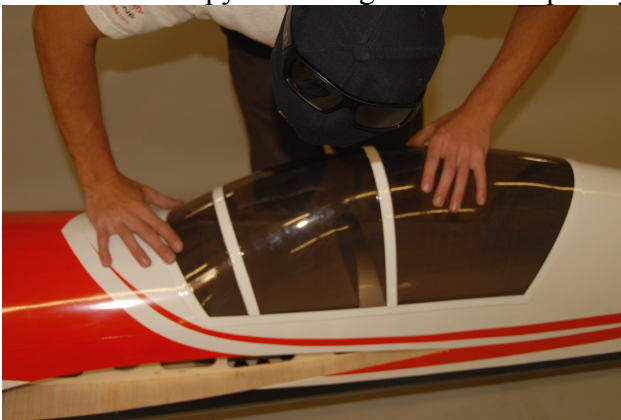
Tools Required:

- ❑ Modeling Knife
- ❑ Lexan Scissors
- ❑ Canopy Glue
- ❑ Allen Wrench
- ❑ Blue Tape

- ❑ Wax paper
- ❑ The first step is to cut out the canopy. There is a score mark on the canopy, cut it out to this line.
- ❑ Test fit the canopy to the canopy frame to make sure you have trimmed enough off. Put wax paper between the hatch and the plane so not to glue the canopy to the plane.



- ❑ Run a bead of glue around the canopy as shown above, make sure you do not get any glue on the clear part of the canopy, if you do clean it off immediately.
- ❑ Set the canopy on the canopy frame, and use blue tape to hold down the sides of the canopy until the glue dries completely.



- ❑ After the glue has dried remove the blue tape and clean up any excess glue on the canopy.

You have just completed the Canopy Assembly

Radio Gear Installation

You have almost completed the assembly of the Thunder Tiger 35% Extra 260. The final step is to install your radio gear. We will not cover this section of the assembly but will provide you with some pointers.

- ❑ Do not install your batteries until you have everything else installed on your plane including the receivers. Once you have everything installed in your plane, put the plane together including wings, stabs, canopy, prop, and spinner. Check the CG at the point specified in this manual. Use the batteries to adjust the balance in the plane to obtain CG as per this manual.
- ❑ Use some sort of battery redundancy with 2 batteries of at least 5200 mAh each.
- ❑ Install all gear per the manufactures specifications

- ❑ Place foam underneath all batteries, receivers, and all electronic devices
- ❑ Secure all electronic devices with Velcro straps or Zip Ties
- ❑ You can check some of the popular r/c bulletin boards to get additional setup information

Take your time on this step it is worth taking an extra couple of hours to make sure that everything is secured and installed correctly than lose your new airplane.

CG Location

We suggest starting out with the CG set at 7.50". This is a good starting point for the first couple of flights on your plane. After you become comfortable with how it flies you can move the CG around to your liking. You can also search on some of the popular bulletin boards on the internet to see where other pilots have there CG set.

Recommended Throws

Here are some points for the control throws. Do not use 3d settings until you have flown the plane several times and are familiar with the planes low rates. The 3D rates are intended to extreme aerobatics.

Surface Area	High Rate (3D)	Low Rates
Ailerons	30+ deg	18 deg
Elevators	40+ deg	18 deg
Rudder	40 deg	25 deg

If you are in doubt about your skills, ask an experienced pilot to help you with a trainer cord.

Before you fly for the first time

Take a few minutes to re-check each servo and make sure all screws are in place and snug. We recommend you use metal gear servos , place one drop of thread locker on the screws that hold the arms on the servos. Re-check all control horns, and all linkages for slop or looseness. This would greatly increase that chances of flutter and could destroy your airplane. This is a 3D Aerobatic airplane with large surfaces. Be careful to keep everything tight and control your speed when flying.

Before or after every flight you should go over the plane and check hinges, prop, spinner, control linkages, and bolts. This will only make your plane last longer and ensure your safety and the others around you.

Checklist:

- ❑ Stab Bolts
- ❑ Wing Bolts
- ❑ Servo Connections Going the right direction
- ❑ Prop
- ❑ Spinner
- ❑ Control Horns
- ❑ Linkages
- ❑ Rudder Cable
- ❑ Canopy Bolts
- ❑ Loose Covering

THUNDER TIGER



Thank you, for purchasing the 35 % Extra 260. We hope is provides you with many hours of enjoyment. Good Luck

Thunder Tiger